S3 National 5
Block Test 1 Revision Sheet

Fractions (Non-Calculator)

Question 1
Find:

(a) $\frac{2}{5} + \frac{1}{5}$

(b) $\frac{4}{5} + \frac{2}{3}$

(c) $\frac{8}{9} - \frac{2}{3}$

(d) $\frac{4}{5} - \frac{3}{8}$

(e) $2\frac{4}{5} + 3\frac{3}{4}$

(f) $1\frac{1}{7} + \frac{3}{5}$

(g) $5\frac{2}{3} - 3\frac{3}{5}$

(h) $5\frac{1}{3} - 2\frac{3}{4}$

Question 2
Find:

(a) $\frac{4}{9} \times \frac{7}{8}$

(b) $\frac{2}{3} \times \frac{9}{16}$

(c) $2\frac{1}{3} \times 1\frac{1}{5}$

(d) $5\frac{5}{6} \times 1\frac{3}{7}$

(e) $\frac{5}{6} \div \frac{2}{3}$

(f) $\frac{7}{9} \div \frac{2}{3}$

(g) $\frac{15}{7} \div \frac{5}{14}$

(h) $3\frac{5}{9} \div 2\frac{2}{3}$

Question 3
Find:

(a) $\frac{1}{2} + \frac{1}{3} \times \frac{1}{6}$

(b) $\frac{5}{6} - \frac{1}{5} \times \frac{5}{12}$

(c) $\frac{3}{4}\left(\frac{1}{3} + \frac{2}{7}\right)$

(d) $\frac{2}{11} \, of \, 5\frac{1}{2} \times \frac{1}{6}$

(e) $\left(\frac{11}{14} \, of \, 2\frac{4}{5}\right) \div \frac{3}{4}$

(f) $1\frac{1}{7} \, of \, \left(2\frac{3}{4} - \frac{7}{8}\right)$

Function Notation (Non-Calculator)

Question 1
If f(x) = 2x + 5, find the values of:
(a) f(6)   (b) f(0)   (c) f(-5)

Question 2
If f(x) = 3x – 2, find the values of:
(a) f(4)   (b) f(-2)   (c) f(10)

Question 3
If g(x) = 1 – 3x, find the values of:
(a) g(4)   (b) g(-1)   (c) g(-5)

Question 4
If f(x) = 3x – 8 and f(t) = 13, find the value of t.

Question 5
If f(x) = 10x – 3 and f(t) = 25, find the value of t.

S2 Algebra (Non-Calculator)

Question 1
Multiply out the brackets:
(a) 2(2g + 3)   (b) 3(4a + 1)   (c) 5(1 + 2d)   (d) 2(3 − 4k)
(e) 6(6h − 1)   (f) 10(3 − 7n)   (g) 4(2a + 3y)   (h) 5(3t + x)
(i) 2(4b − 3c)   (j) 8(10k − 3p)   (k) 7(11n − 9x)   (l) 6(3ab − d)
(m) x(y + 5)   (n) a(p + 8)   (o) w(t − 1)   (p) g(g − 2)
(q) a(n + 9)   (r) w(m − a)   (s) e(f − 10)   (t) x(2 + x)
(u) a(2n + g)   (v) x(4y + 3u)   (w) 6a(2 − 4a)   (x) 3u(10u − w)

Question 2
Solve each of the following equations:
(a) 2(x + 1) = 10   (b) 3(2x + 8) = 30   (c) 5(5x − 1) = 20
(d) 4(4y + 1) = 36   (e) 9(2y − 10) = 0   (f) 7(5y − 2) = 56
(g) 3(k + 2) + 6 = 21   (h) 4(2w + 1) − 3 = 17   (i) 3(3p + 3) + 3p = -3
(j) 5(q + 3) + 2(2q − 5) = 23   (k) 5(3d + 2) + 3(1 − 2d) = 13

Question 3
Solve each of the following equations:

(a) $\frac{1}{2}x + 3 = 9$ (b) $\frac{1}{4}x − 2 = 1$ (c) $\frac{1}{8}x + 5 = 8$

(d) $\frac{2}{3}x − 1 = 3$ (e) $\frac{3}{5}x + 11 = 0$ (f) $30 − \frac{3}{8}x = 21$

(g) $\frac{1}{2}x + 1 = \frac{1}{3}x + 3$ (h) $\frac{3}{4}x − 5 = \frac{3}{5}x − 2$ (i) $\frac{1}{3}x + \frac{1}{2} = \frac{1}{4}x + \frac{1}{5}$
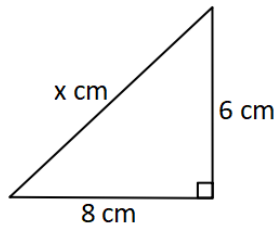
Question 4
Factorise fully:
(a) 4a + ac   (b) 6v − gv   (c) xy + xz   (d) p^2 + 9p
(e) 3g − g^2 (f) n^2 − 4n   (g) 7xr + 7xs   (h) 3jk − 6jh
(i) 12vw − 12w   (j) $3d^2$ + 8d   (k) $9g^2$ − 15ge   (l) $2n^2$ − n
(m) 4a + $14a^2$ (n) p − $2p^2$ (o) $3c^2$ − 12dc   (p) 16ab + $24b^2$
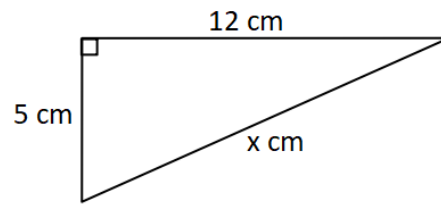
Pythagoras (Calculator)

Question 1
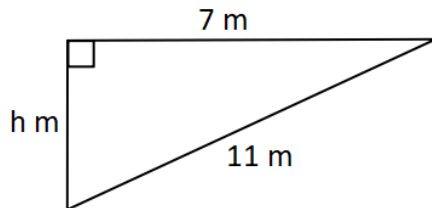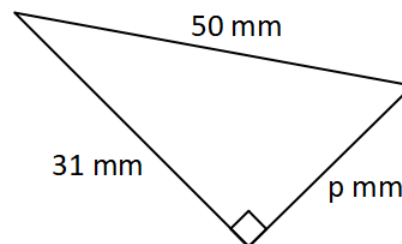Use Pythagoras' theorem to calculate the length of the hypotenuse in each triangle:

(a)

x cm

6 cm

8 cm

(b)

12 cm

5 cm

x cm

Question 2
Calculate the size of each of the smaller sides in these triangles:

(a)

7 m

h m

11 m

(b)

50 mm

31 mm

p mm

Question 3
The diagram below shows the position of three towns.
Lowtown is due west of Midtown.
The distance from

- Lowtown to Midtown is 75 kilometres.
- Midtown to Hightown is 110 kilometres.
- Hightown to Lowtown is 85 kilometres.

Hightown

85 km

110 km

Lowtown   75 km   Midtown

Is Hightown directly north of Lowtown?
Justify your answer.

Changing the Subject of the Formula (Non-Calculator)

Question 1
Change the subject of the formula to the letter given in square brackets:

(a) $v = u + at$ [a]   (b) $v^2 = u^2 + 2as$ [s]

(c) $s = ut + \frac{1}{2}at^2$ [u]   (d) $P = mgh$ [g]

(e) $V = \pi r^2 h$ [h]   (f) $K = \frac{1}{2}mv^2$ [m]

(g) $A = \pi r^2$ [r]   (h) $V = \pi r^2 h$ [r]

(i) $V = \frac{1}{3}\pi r^2 h$ [r]   (j) $V = \frac{4}{3}\pi r^3$ [r]

(k) $V = \sqrt{t^2 - 3}$ [t]   (l) $p = \pi n^2 + 2n^2$ [n]

(m) $m = 2\pi\sqrt{v}$ [v]   (n) $d = \sqrt{\frac{4A}{\pi}}$ [A]

(o) $T = 2\pi\sqrt{\frac{L}{g}}$ [L]

Percentages (Calculator)

Question 1
The Smiths buy a house for £60 000. If it appreciates in value at the rate of 9% per year, how much will it be worth in 5 years time?

Question 2
Amanda wins some money and decides to spend £200 on jewellery. If it appreciates at the rate of 2% per year, how much will the jewellery be worth 3 years from now?

Question 3
Peter buys a car for £3 000. If it depreciates at the rate of 20% per annum, how much will he be able to sell it for in 3 years time?

Question 4
Paul buys a new car costing £12 600. It depreciates in value by 30% in the first year and by 20% each year after that. How much will he be able to trade it in for in 3 years time?

Question 5
The price of a car has increased in value by 30%. If the car is now valued at £7 800, what was the previous value of the car?

Question 6
The roll of school has fallen by 15% since the year 2001. If the school roll is now 1 190, what was the roll in 2001?

Question 7
The population of a Scottish village has dropped by 35%. If the population is now 420, what was the population originally?

Straight Line (Non-Calculator)

Question 1
Find the gradient of the line joining the two points:
(a) M (2, 2) and N (-3, 4)   (b) P (5, -1) and Q (-2, 10)
(c) R (-3, -5) and S (8, -4)   (d) T (4, -6) and U (7, -2)
(e) V (5, -6) and W (-2, 6)   (f) X (-1, 7) and Y (-2, 6)

Question 2
State the gradient and the coordinates of the y-intercept for each line below:
(a) $y = x - 7$ (b) $y = -5x + 3$ (c) $5y = 3x - 10$
(d) $y = -4x$ (e) $2x + y = 11$ (f) $2y = x - 5$
(g) $3y - x = 18$ (h) $3x + 7y - 21 = 0$

Question 3
Write down the equation of the lines described below:
(a) with gradient 4, passing through the point (0, 5)
(b) with gradient -2, passing through the point (0, 1)
(c) with gradient $\frac{3}{4}$, passing through the point (0, -3)
(d) with gradient 4, passing through the point (3, 1)
(e) with gradient -5, passing through the point (-3, 1)
(f) with gradient $\frac{1}{2}$, passing through the point (-5, -2)

Question 4
Find the equation of the line joining each pair of points below:
(a) A (4, 3) and B (8, 11)   (b) C (1, 9) and D (3, 1)
(c) E (-2, 6) and F (8, 8)

Question 5
Find the equation of the straight line shown in the diagram below:
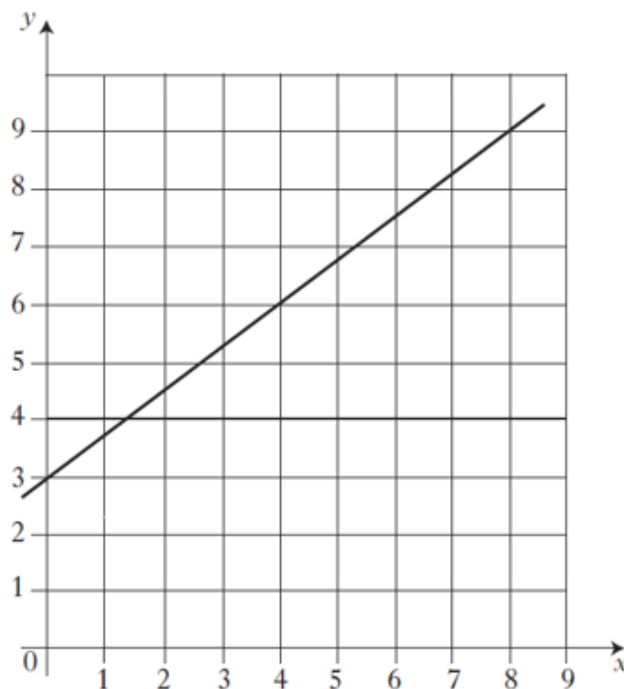
Trigonometry (Calculator)

Question 1
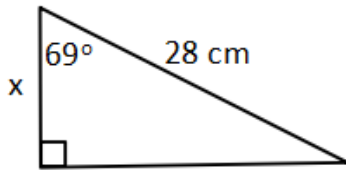Calculate the value of x in each of the following triangles (to 1 decimal place).

(a)

15 cm

x

20°

(b)
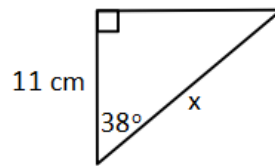
x

54°

11 cm

(c)

69° 28 cm

x

(d)

11 cm

38° x

(e)

17·5 cm

x

60°

(f)

x 82°

24 cm
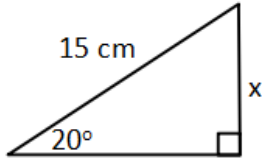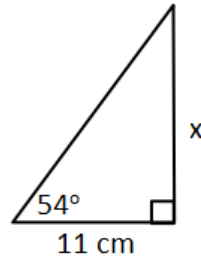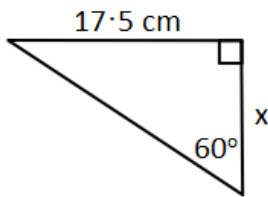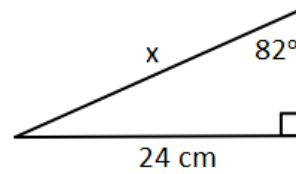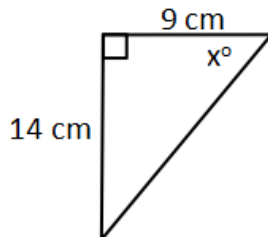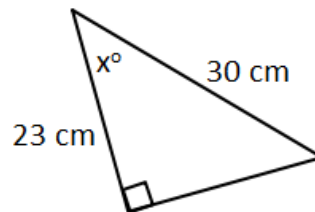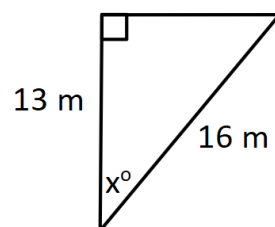
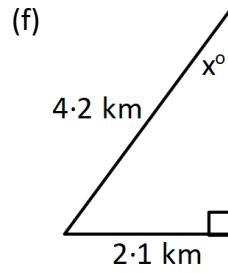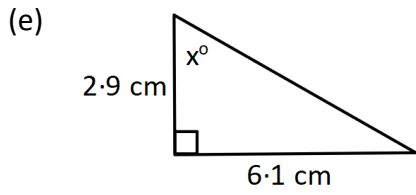## Question 2
Calculate the size of angle x° in each case.

(a)

9 cm

x°

14 cm

(b)

x° 30 cm

23 cm

(c)

85 cm

420 mm

x°

(d)

13 m

16 m

x°

(e)

$x°$

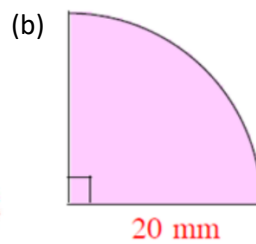2·9 cm

6·1 cm

(f)

$x°$

4·2 km

2·1 km
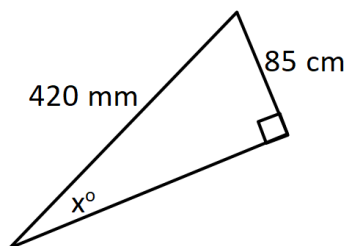
Circles (Calculator)

Question 1

Calculate the circumference of the following circles:

(a)

12 cm

(b)

0·5 cm
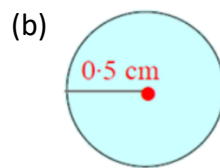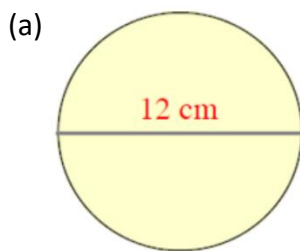
Question 2

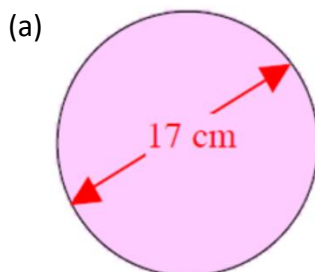Calculate the perimeter of each shape:

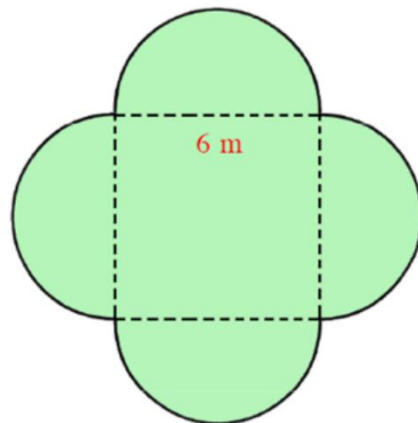(a)

2·5 m

3·3 m

(b)

20 mm
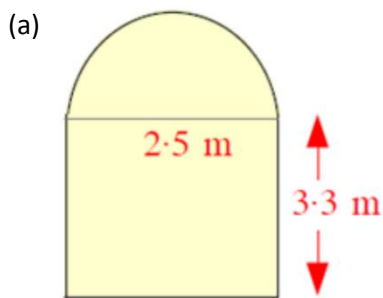
Question 3

Find the area of each circle below:

(a)

17 cm

(b)

2 m
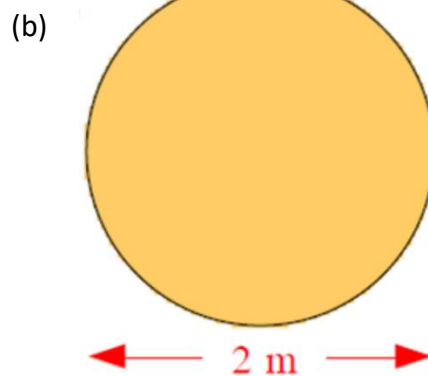
Question 4

A garden is designed as shown using a square of side 6 metres and four semi-circles.

6 m
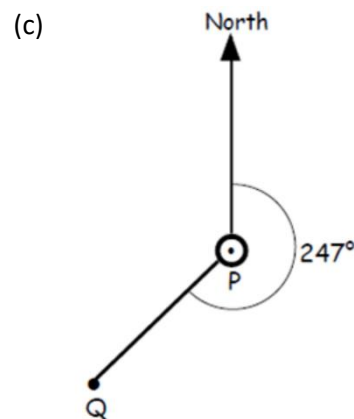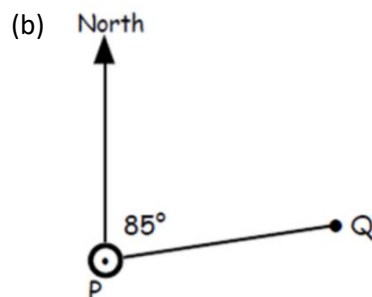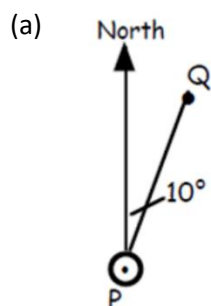
Find the total area of the garden.

Bearings (Non-Calculator)

Question 1

Calculate the bearing of P from Q in the diagrams below:

(a)

North

Q

10°

P

(b)

North

85°

Q

P

(c)

North

247°

P

Q

Question 2

The vertices of triangle ABC are shown,
together with bearings from A to B,
B to C and C back to A.

Calculate the sizes of <ABC, <ACB and <BAC.

North

B

169°

?

North

64°

this is only
a rough sketch

North

A

?

?

C

287°